

NEW PUBLICATIONS

January-March 1986



ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION
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Fort Collins, Colorado 80526

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ORIGINAL

RESEARCH PAPERS

- 1 Mowrer, H. Todd. 1986. ASPNORM: A normal diameter distribution growth and yield model for aspen in the central Rocky Mountains. USDA Forest Service Research Paper RM-264, 12 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Development of a normal diameter distribution growth and yield model for pure, even-aged, unthinned clones of aspen in the central Rocky Mountains is described, including testing for normality of diameter distributions, development of regression estimators for stand parameters, model validation, and model application.

- 2 Van Haverbeke, David F. 1986. Genetic variation in ponderosa pine: A 15-year test of provenances in the Great Plains. USDA Forest Service Research Paper RM-265, 16 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Survival was highest and height growth greatest in ponderosa pine provenances from northcentral Nebraska, southwest South Dakota, and the High Plains region. Genotype x environment interaction was minimal in central and northern Great Plains plantations. Age/age correlations indicate provenances expressing superior height growth can be identified after 5 or 10 years.

GENERAL TECHNICAL REPORTS

- 3 Mitchell, John E., and James B. Pickens. 1986. An evaluation of procedures used to predict timber growth and harvest in the Range and Multiple Resource Interactions sections of the 1980 RPA Assessment. USDA Forest Service General Technical Report RM-124, 10 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Interdisciplinary (ID) team estimates of wood growth and harvest used in the Range and Multiple Resource Interactions sections of the 1980 RPA Assessment were evaluated by checking for the presence of joint resource production estimates, examining data set documentation, and searching for logical and procedural errors. Apparent deficiencies in ID-team training and procedural documentation were found to limit the usefulness of the wood growth and harvest estimates.

- 4 Landis, Thomas D., and James W. Fischer*, technical coordinators. 1986. Proceedings: Intermountain Nurserymen's Association Meeting. [Fort Collins, Colo., August 13-15, 1985]. USDA Forest Service General Technical Report RM-125, 111 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Twelve invited papers were presented on a variety of topics of interest to nursery managers growing bareroot and/or containerized seedlings. Nine additional papers were presented in the form of small group workshops on weed control, seedling quality, and bareroot seedling fertilization.

RESEARCH NOTES

- 5 Haase, Sally M. 1986. Effect of prescribed burning on soil moisture and germination of southwestern ponderosa pine seed on basaltic soils. USDA Forest Service Research Note RM-462, 6 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Prescribed burning created a more favorable seedbed by exposing mineral soil and increasing soil moisture, resulting in a twenty-fold increase in the number of seeds germinating on burned compared to unburned sites.

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- 6 Harrington, Michael G. 1986. Comparison of forest floor depth to loading relationships from several Arizona ponderosa pine stands. USDA Forest Service Research Note RM-463, 5 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

The forest floor depth to loading relationships of a south-eastern Arizona ponderosa pine stand was developed for use in general fuel loading assessments. A comparison of this relationship with those from other Arizona ponderosa pine stands revealed some large differences. Therefore, users are cautioned about the widespread application of individual depth to loading relationships.

- 7 Ryan, Michael G., and W. Wallace Covington*. 1986. Effect of a prescribed burn in ponderosa pine on inorganic nitrogen concentrations of mineral soil. USDA Forest Service Research Note RM-464, 5 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Soil inorganic nitrogen was measured during the summer after a fall prescribed burn at a ponderosa pine site in northern Arizona. Fire behavior varied among sawtimber, pole, and sapling stands; the greatest fuel reduction occurred in the sawtimber. Ammonium-nitrogen content of the upper 15 cm of soil in the burned sawtimber plots was as much as 80 times greater than in unburned plots. The increased availability of nitrogen after burning may affect regeneration, understory growth, and growth of overstory trees.

RESOURCE BULLETIN

- 8 Sorg, Cindy F., and Louis J. Nelson*. 1986. Net economic value of elk hunting in Idaho. USDA Forest Service Resource Bulletin RM-12, 21 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

Net willingness to pay in addition to actual expenditure for elk hunting in Idaho was estimated at \$63.17 per trip and \$99.82 per trip using a standard cost per mile travel cost method and a reported cost per mile travel cost method, respectively. Using the contingent value method, the values for the 1982 and 83 elk hunting seasons were \$51.84 per trip and \$92.54 per trip, respectively. Willingness to pay was greater for double number of elk seen on a trip. Methods, results, and applications are fully described.

OTHER

- 9 Peterson, Glenn W., technical coordinator. 1986. Recent research on conifer needle diseases: Proceedings of the International Union of Forestry Research Organizations Working Party on Needle Diseases Conference. [Gulfport, Miss., October 14-18, 1984]. U.S. Department of Agriculture, Forest Service, General Technical Report WO-50, 106 p. Washington, D.C.

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Results of current research on foliage diseases of conifers in several countries were presented in 15 papers. The results included aspects of infection, genetic resistance, ecology, epidemiology, taxonomy, and control.

AVAILABLE

- 10 Fresquez, P. R., E. F. Aldon, and W. C. Lindemann*. 1986. Microbial re-establishment and the diversity of fungal genera in reclaimed coal mine spoils and soils. Reclamation and Revegetation Research 4:245-258.

The degree of soil microbial re-establishment and the diversity and similarity of fungal genera were evaluated on an undisturbed reference soil and on eight reclaimed coal mine spoil and soil sites varying in age, soil characteristics, vegetation, and type of post-mining revegetation treatment. The oldest topsoiled site, was considered more stable in that soil chemical and physical properties were more nearly similar to the undisturbed soil, than the oldest non-topsoiled spoil site. Also, the similarity in terms of the populations of soil microorganisms suggest that the microbial community may have begun to stabilize 4 years after topsoiling and revegetation.

- 11 Kaufmann, Merrill R. 1985. Annual transpiration in subalpine forests: Large differences among four tree species. Forest Ecology and Management 13:235-248.

A canopy transpiration model, RM-CWU, was used to estimate transpiration of subalpine forest trees. Simulations indicate a threefold difference in annual transpiration among species in the central Rocky Mountains. Ratios of annual transpiration for stands of equal basal area are 3.2 : 2.1 : 1.8 : 1 for Engelmann spruce, subalpine fir, lodgepole pine, and aspen, respectively. Species differences may be attributed to differences in leaf conductance, leaf-air temperature difference, leaf area index, and length of the transpiration season. The large range of annual transpiration suggests that manipulation of stand composition and density is a viable approach to influence water yield from subalpine watersheds.

- 12 Sturges, David L. 1986. Responses of vegetation and ground cover to spraying a high elevation, big sagebrush watershed with 2,4-D. Journal of Range Management 39(2): 141-146.

Total production of aboveground biomass on a 238-ha watershed was not affected when big sagebrush was controlled by aerial application of 2,4-D. Grass production increased in the 5 years following treatment, but forb production was not affected by treatment because forbs were in an early phenological stage when sprayed. Five years after treatment, there was a 37% decrease in bare ground and a 29% and 61% increase in litter and grass cover, respectively, on the treated watershed compared to an adjacent untreated watershed.

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- 13 Szaro, Robert C., and Martin D. Jakle*. 1985. Avian use of a desert riparian island and its adjacent scrub habitats. *The Condor* 87:511-519.

A riparian bird community in central Arizona contributed from 23 to 33% of the birds along the adjacent desert washes, and from 7 to 15% of the birds in the adjacent desert upland. Conversely, the desert bird community contributed only from 1 to 1.5% of the birds in the riparian island. Bird density ranged from 336 to 446 birds/49 ha in the riparian core and edge in 1981 and 1982. Bird density in the adjacent desert decreased with distance from the edge of the riparian island to a low of 101 birds/40 ha in 1981, to 137 birds/40 ha in 1982, in the segment 600 to 1,000 m from the riparian edge.

- 14 Troendle, C. A., and R. M. King. 1985. The effect of timber harvest on the Fool Creek watershed, 30 years later. *Water Resources Research* 21(12):1915-1922.

The Fool Creek watershed at the Fraser Experimental Forest, Colorado was harvested using a pattern of alternating clear-cut and forested strips in 1956. Today, with almost 30 years of postharvest record, subtle impacts in the hydrology of the watershed can be detected that were not significant in the past. Peak discharges, advanced 7.5 days following harvest, have also been increased 20%, with the largest effect occurring in the wettest years. Increases in peak water equivalent, annual flow, and date of peak flow occurrence will appear to be returning to preharvest levels at a very slow rate.

- 15 Uresk, Daniel W., and Teruo Yamamoto*. 1986. Growth of forbs, shrubs, and trees on bentonite mine spoil under greenhouse conditions. *Journal of Range Management* 39(2):113-117.

Revegetation on raw bentonite spoil with or without treatments is often more practical than replacing topsoil in areas where it is scarce or nonexistent. The effect of raw bentonite spoil treated with ponderosa pine sawdust on plant survival and growth was compared to other treatments including perlite, gypsum, straw, vermiculite, and no treatment. The growth promoting effect of sawdust is particularly promising; it is readily available and cost is minimal.

AVAILABLE FROM OTHER SOURCES

The following publications, not available from the Rocky Mountain Station, are available directly from the publisher, or at most university and some public libraries.

- Agnew, William*, Daniel W. Uresk, and Richard M. Hansen*. 1986. Flora and fauna associated with prairie dog colonies and adjacent ungrazed mixed-grass prairie in western South Dakota. *Journal of Range Management* 39(2):135-139.

Vegetation, small rodents, and birds were sampled during the growing seasons of 2 years on prairie dog colonies and adjacent mixed-grass prairie in western South Dakota. Prairie dog grazing decreased mulch cover, maximum height of vegetation, plant species richness, and tended to decrease live plant canopy cover. Prairie dog towns supported greater densities of small rodents but significantly few species compared to undisturbed mixed-grass sites.

- Baker, Malchus B., Jr. 1986. Effects of ponderosa pine treatments on water yield in Arizona. *Water Resources Research* 22(1):67-73.

Annual water yields were determined for three levels of overstory removal and three levels of strip cut with thinning applied on ponderosa pine watersheds. Water yield increases from a completely cleared watershed were statistically significant for 7 years, losing significance after recovery and growth of Gambel oak and herbaceous vegetation. Water yield increase remained at a 15% level during the first 6 years on a strip-cut watershed with 60% of its area on northern aspects.

- Fresquez, P. R., Earl F. Aldon, and W. C. Lindemann*. 1985. Litter decomposition on reclaimed coal mine spoils and soils in the arid Southwest. p. 157-161. In *Symposium on surface mining, hydrology, sedimentology, and reclamation*. [Lexington, Ky., December 9-13, 1985]. University of Kentucky, Lexington.

Fiberglass litter bags containing stripped alfalfa stem litter and cellulose filter paper were deposited on and buried in an undisturbed soil, and on eight reclaimed topsoiled and nontopsoiled areas. Changes in decomposition potential, especially in the older nontopsoiled areas, at the 6 cm depth adversely influenced the early stages of litter decay. The older 4- and 5-year old topsoiled area had decomposition parameters more similar to the undisturbed soil compared to the nontopsoiled spoils.

- Grubb, Teryl G., Wade L. Eakle*, and Benjamin N. Tuggle*. 1985. *Haematosiphon inodorus* (Hemiptera:Cimicidae) in a nest of a bald eagle *Haliaeetus leucocephalus* in Arizona. *Journal of Wildlife Diseases* 22(1):125-127.

During the late spring/early summer of 1985, the first and second authors examined 31 eagle nests (18 bald and 13 golden) in central Arizona, including the 1984 infested nest described in this paper. Two young successfully fledged from the same nest in 1985, but there was no evidence of *H. inodorus*. However, another successful bald eagle nest had a concentration of 0.1 bugs/sq. cm 2 weeks after fledging. Concentrations of 0.2 bugs/sq. cm were found in two successful golden eagle nests within 1 week after fledging.

- Heede, Burchard H. 1985. Application of geomorphological concepts to evaluate timber harvest influences on a stream channel—A case study. *Zeitschrift für Geomorphologie N.F. Suppl.-Bd.* 55:121-130.

This case study demonstrated the usefulness of geomorphologic considerations in the assessment of land management effects on streams. It was shown that probably reduction of transpiration due to timber removal and not the logging operation per se caused increased adjustment (erosion) rates.

Hinds, T. E., and M. G. Ryan. 1985. Expansion of sooty bark and *Ceratocystis* cankers on aspen. *Plant Disease* 69(10):842-844.

Expansion of sooty bark cankers, caused by *Encoelia pruinosus*, was measured on 143 aspen to predict years to tree mortality. The mean vertical expansion of 87 cankers was 44.9 ± 3.7 cm/yr. Cankers expanded circumferentially at a mean rate of 16.3 ± 0.7 cm/yr. Tree longevity can be predicted by dividing the circumference of the trunk not yet invaded by the canker by the horizontal expansion rate of the canker and adding 1 yr. *Ceratocystis fimbriata* seldom girdles a tree. The mean horizontal and vertical growth rates for 26 *Ceratocystis* cankers examined were 1.3 ± 0.2 and 2.8 ± 0.4 cm/yr.

Peterson, Glenn W. 1986. Resistance to *Phomopsis juniperovora* in geographic seed sources of *Juniperus virginiana*. p. 65-69. In *Recent research on conifer needle diseases*. [Gulfport, Miss., October 14-18, 1984]. U.S. Department of Agriculture, Forest Service, General Technical Report WO-50, 106 p. Washington, D.C.

Progenies from 86 select *J. virginiana* trees in the Great Plains were inoculated with *P. juniperovora* and infection was evaluated to determine the degree of resistance to this fungus. The field growth and survival of 15 of the 20 resistant progenies after years were above plantation averages.

Riffe, Jerry W. 1986. Mushroom collecting and mycorrhizae. p. 149-153. In *Conference papers of the 9th annual trees for Nebraska conference*. [Lincoln, Neb., February 14-15, 1986] 159 p. Dave Mooter and Jim Locklear, technical editors. Department of Horticulture, University of Nebraska, Lincoln.

Some fungi that produce mushrooms also infect roots of trees and form a mutually beneficial association called mycorrhizae. Procedures for collecting and identifying mushrooms, and for determining which fungi form mycorrhizae on a tree species are discussed.

Schmidt, R. A. 1986. Transport rate of drifting snow and the mean wind speed profile. *Boundary-Layer Meteorology* 34:213-241.

Transport rates, measured by weighing snow blown into a filter fabric trap, were greater over hard snow or ice than for the same wind speed over soft, fresh snow surfaces. Analysis of wind speed profile from nine blizzards showed that friction between moving particles and the surface was less, and particle speeds were greater over hard surfaces. Transport rates at a given wind speed increased rapidly as aerodynamic roughness decreased in the rough-smooth transition region. Bagnold's theory for bed load transport provided a useful framework for the analysis.

Schreuder, H. T., and C. E. Thomas*. 1985. Efficient sampling techniques for timber sale surveys and inventory updates. *Forest Science* 31(4):857-866.

Three different regression estimators, predicting tree or plot volume from tree diameter squared times total height or previous plot volume 5 or 10 years earlier for specific populations, were studied with respect to minimum relative bias, minimum variance, percentage of confidence intervals containing true volume, and consistency in estimating total volume using six sampling rules. Two of the sampling rules yielded the most efficient volume estimators in all three populations.

Severson, Kieth E. 1986. Small mammals in modified pinyon-juniper woodlands, New Mexico. *Journal of Range Management* 39(1):31-34.

The effects of pinyon-juniper treatments on rodent abundance, 13 to 18 years after treatment, were studied in southwestern New Mexico from 1981 to 1983. Treatments including bulldozing, bulldozing/piling/burning, thinning, and untreated woodland. Treatments did not influence number of different rodent species. Data indicate that numbers of individuals and proportions of rodent species can be affected by manipulation of pinyon-juniper overstory and method of slash disposal.

Tinus, Richard W. 1986. In-bed herbaceous windbarrier produced more ponderosa pine seedlings. p. 3-6. In *Proceedings: Intermountain Nurserymen's Association Meeting*. [Fort Collins, Colo., August 13-15, 1985]. USDA Forest Service General Technical Report RM-125, 111 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins.

There are currently no windbreaks at the Albuquerque Tree Nursery, but experience at other nurseries indicates windbreaks can be highly beneficial. With the windbarrier, increases in seedling fresh weight and epicotyl height, and greener color were observed, but variability was too great for the differences to be significant. Windbarriers in adjacent beds across a section had no significant cumulative effect.